Docket No.: 377882000800
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Gary VAN NEST et al.

Application No.: 09/642,492 Confirmation No.: 7136

Filed: August 18, 2000 Art Unit: 1648

For: METHODS OF MODULATING AN IMMUNE RESPONSE USING IMMUNOSTIMULATORY SEQUENCES AND COMPOSITIONS FOR USE THEREIN Examiner: E. Le

REPLY BRIEF

MS Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

This Reply Brief is in response to the Examiner's Answer, dated July 30, 2007, for which a response is due on September 30, 2007. This response is timely filed.

I. STATUS OF CLAIMS

A. Total Number of Claims in Application

There are 52 claims in the application.

B. Current Status of Claims

1. Claims canceled: 2-12, 24, 34-36, and 53

2. Claims withdrawn from consideration but not canceled: 43-52

3. Claims pending: 1, 13-23, 25-33, and 37-52

4. Claims allowed: none

5. Claims rejected: 1, 13-23, 25-33, 25-33, and 37-42

C. Claims on Appeal

The claims on appeal are claims 1, 13-23, 25-33, and 37-42.

II. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The grounds of rejection on Appeal are:

A. Whether claims 1, 13, 14, 17, 20-23, 25-33, 37, and 40-42 are patentable under 35 U.S.C. §103(a) over Schwartz *et al.* (PCT Application No. WO 98/55495) or Carson *et al.* (PCT Application No. WO 98/16247), in view of Horner *et al.* (*Cellular Immunology* 190:77-82, 1998) or Chu *et al.* (*Journal of Experimental Medicine* 186(10): 1623-1631, 1997).

B. Whether claims 15 and 38 are patentable under 35 U.S.C. §103(a) over Schwartz *et al.* (PCT Application No. WO 98/55495) or Carson *et al.* (PCT Application No. WO 98/16247), in view of Horner *et al.* (*Cellular Immunology* 190:77-82, 1998) or Chu *et al.* (*Journal of Experimental Medicine* 186(10): 1623-1631, 1997), and further in view of Lee *et al.* (*Ann. Med.* 30:460-468, 1998).

C. Whether claims 16 and 39 are patentable under 35 U.S.C. §103(a) over Schwartz *et al.* (PCT Application No. WO 98/55495) or Carson *et al.* (PCT Application No. WO 98/16247), in view of Horner *et al.* (*Cellular Immunology* 190:77-82, 1998) or Chu *et al.* (*Journal of Experimental Medicine* 186(10): 1623-1631, 1997), and further in view of Durali *et al.* (*Journal of Virology* 72(5): 3547-3553, 1998).

D. Whether claims 18 and 19 are patentable under 35 U.S.C. §103(a) over Schwartz *et al.* (PCT Application No. WO 98/55495) or Carson *et al.* (PCT Application No. WO 98/16247), in view of Horner *et al.* (*Cellular Immunology* 190:77-82, 1998) or Chu *et al.* (*Journal of Experimental Medicine* 186(10): 1623-1631, 1997), and further in view of Anderson (U.S. Patent No. 4,673,574).

III. RESPONSE TO EXAMINER'S ANSWER

Appellants respectfully request consideration of the following remarks in view of the Examiner's Answer on Appeal mailed July 30, 2007. Appellants maintain the arguments set forth in Appellants' Appeal Briefs filed on July 12, 2006 and the related communications filed on November 6, 2006 and December 28, 2006.

A. Claims 1, 13, 14, 17, 20-23, 25-33, 37, and 40-42 are patentable under 35 U.S.C. §103 over Schwartz *et al.* (PCT Application No. WO 98/55495) or Carson *et al.* (PCT Application No. WO 98/16247), in view of Horner *et al.* (*Cellular Immunology* 190:77-82, 1998) or Chu *et al.* (*Journal of Experimental Medicine* 186(10): 1623-1631, 1997).

CLAIMS 1, 13, 25-33 AND 42

1. The Examiner has failed to establish a prima facie case for obviousness.

A *prima facie* case of obviousness requires that three basic criteria must be met. First, the prior art reference (or references when combined) must teach or suggest all the claim limitations. Second, there must be some suggestion of motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify a reference or to combine reference teachings. Finally, there must be a reasonable expectation of success. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in the Appellants' disclosure. *In re Vaeck*, 947 F.2d 488, 493 (Fed. Cir. 1991); MPEP §2143. In *KSR*, the Supreme Court stated that the *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1 (1966) factors still control an obviousness inquiry. *KSR Int'l Co. v. Teleflex Inc.*, 82 U.S.P.Q.2d 1385, 1391 (2007). Those factors are: 1) "the scope and content of the prior art," 2) the "differences between the prior art and the claims," 3) "the level of ordinary skill in the pertinent art," and 4) objective evidence of nonobviousness. *Id.* (quoting *Graham*, 383 U.S. at 17-18).

The present invention is based on the observed benefit of co-administration of an immunomodulatory polynucleotide-first antigen complex with a second antigen in the *modulation of an immune response to the second antigen*. In contrast to the Examiner's assertions, unexpected results have been demonstrated for the claimed invention (*see*, *inter alia*, page 7, line 25 through page 8, line 26 of the specification). As discussed further below, it was surprising that the administration of (i) a first antigen conjugated to an immunomodulatory polynucleotide and (ii) a second, unrelated antigen produced a much greater Th1 response against the second antigen than the administration of (i) the same immunomodulatory polynucleotide without the first antigen and (ii) the second antigen. Thus, the present invention is based in part on the surprising discovery that administration of a first antigen that is conjugated to an immunomodulatory polynucleotide enhances the Th1 response to a second, unrelated antigen compared to the same method in the absence of the first antigen.

a. The cited references do not reach or suggest each and every limitation of the claimed invention, either singly or in combination.

None of the cited references, or a combination thereof, teaches all of the elements of the claimed invention.

Claim 1 (upon which claims 13, 14, 17, 20-23, 25-33, and 42 depend) recites a method of modulating an immune response *to a second antigen* through *co-administration* of (i) a complex comprising an immunomodulatory polynucleotide covalently conjugated to a first antigen and *(ii) a second antigen*, where the polynucleotide comprises an ISS comprising the sequence 5'-cytosine, guanine-3', where *the complex and the second antigen are administered at the same site*, and where the amount of the complex administered is sufficient to modulate an immune response *to the second antigen*.

i. Deficiencies of Schwartz *et al.*, PCT Application No. WO 98/55495 ("Schwartz")

The Examiner stated that page 12, lines 9-15, of Schwartz suggests the administration of one or more antigens:

> In other embodiments, ISS can be administered in conjunction with one or more members of the group of immunomodulatory molecules comprising antigens and/or immunomodulatory facilitators such as co-stimulatory molecules and adjuvants. (parentheticals omitted)

A reasonable interpretation of this sentence from Schwartz is that the ISS can be administered with an antigen and/or an immunomodulatory facilitator (not that the ISS can be administered with two antigens or two immunomodulatory facilitators). This interpretation is supported by the following statement from the next paragraph in Schwartz (page 12, lines 29-31): "The ISS and the antigen and/or immunomodulatory facilitator can be administered together in the form of a conjugate or co-administered in an admixture sufficiently close in time so as to modulate an immune response." Thus, Schwartz does not teach or suggest the administration of two different antigens to modulate the immune response to the second antigen.

Further, Schwartz does not teach or suggest the use of an ISS-first antigen conjugate to modulate the immune response against a second unconjugated antigen. In particular, Schwartz does not teach co-administration of (i) a complex comprising an immunomodulatory polynucleotide covalently conjugated to a first antigen and (ii) a second antigen, where the amount of the polynucleotide and first antigen administered is sufficient to modulate an immune response to the *second* antigen, as required by claim 1. *See also* pages 25 and 26 of the Appeal Brief, filed July 12, 2006. Thus, Schwartz does not teach all of the elements of the claimed invention.

ii. Deficiencies of Carson *et al.*, PCT Application No. WO 98/16247 ("Carson")

The Examiner stated that page 17, lines 5-10, and page 18, lines 2 and 3, suggest the administration of one or more antigens. In contrast to the Examiner's assertion, Carson repeatedly

describes his technology as including an "ISS-PN/IMM conjugate", where the "ISS-PN" is the polynucleotide, and the "IMM" is the conjugate partner, an "immunomodulatory molecule," or "immunomodulatory agent." Additionally, page 18, lines 7 through page 19, line 17 clarify that the antigen being referred to on page 17 is the antigen that serves as the immunomodulatory agent, not a second antigen. Thus, the case where the "immunomodulatory agent" is an antigen merely describes the main embodiment of the invention, an ISS conjugated to a *single* antigen. Carson does not teach or suggest the administration of two different antigens to modulate the immune response to the second antigen.

Additionally, Carson does not teach or suggest the use of an ISS-first antigen conjugate to modulate the immune response against a second antigen. Specifically, Carson does not teach co-administration of (i) a complex comprising an immunomodulatory polynucleotide covalently conjugated to a first antigen and (ii) a second antigen, where the amount of the polynucleotide and first antigen administered is sufficient to modulate an immune response to the *second* antigen, as required by claim 1. *See also* pages 26 and 27 of the Appeal Brief. Thus, as with Schwartz, Carson does not teach all of the elements of the claimed invention.

iii. The deficiencies of Schwartz *et al.* and Carson *et al.* are not cured by Horner *et al.* (*Cellular Immunology* 190:77-82, 1998) ("Horner") or Chu *et al.* (*Journal of Experimental Medicine* 186(10): 1623-1631, 1997) ("Chu").

Neither Horner nor Chu teaches or suggests modulating an immune response to a *second* antigen through co-administration of the second antigen and a complex comprising an immunomodulatory polynucleotide covalently conjugated to a *first antigen*. *See* page 27 of the Appeal Brief. Thus, neither of these references cures the deficiencies of Schwartz or Carson, as discussed above, *i.e.*, lack of teaching or suggestion regarding administration of second antigen in conjunction with an immunomodulatory polynucleotide-first antigen conjugate.

Therefore, none of the cited references, either alone or in combination, describes or suggests the methods for modulating an immune response to a second antigen as claimed. None of the references, either alone or in combination, teaches all of the elements of the claimed invention, as required for establishment of a *prima facie* case for obviousness under 35 U.S.C. §103.

b. There is no suggestion or motivation to combine or modify the cited references.

A *prima facie* case for obviousness requires that there must be some suggestion of motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify a cited reference or combine reference teachings. *In re Vaeck*, MPEP §2143. The Examiner has failed to point out an explicit suggestion or motivation to combine the cited references to obtain every element of the claimed invention; indeed, this would be impossible since none of the references teach or suggest administration of a *second antigen* in conjunction with an immunomodulatory polynucleotide-first antigen conjugate, as discussed in detail above. *See* pages 28 and 29 of the Appeal Brief.

Both of the primary references, Schwartz and Carson, demonstrate that conjugation of an ISS molecule to an antigen is much more effective in stimulating an immune response to the antigen than administration of the antigen and ISS unconjugated in a mixture. Accordingly, based on the teachings of these references, *i.e.*, the knowledge in the art, the most effective method to stimulate an immune response to an antigen is to administer the antigen in the form of an ISS-antigen conjugate. Thus, to modulate the immune response of a second antigen, one would have been motivated to conjugate the second antigen to the ISS rather than conjugate an unrelated, first antigen to the ISS. For example, page 11, lines 18-28, of Carson suggests that conjugation of an ISS to an antigen affects the way the conjugated antigen is processed. Thus, one would have been motivated to conjugate the ISS to the second antigen to affect how it is processed rather than conjugate the ISS to a first antigen. Therefore, Carson teaches away from the present invention. Also, none of the cited references suggest modifying their technologies to administer a first antigen conjugated to the ISS when an immune response against a second antigen is desired. Nothing in Schwartz or Carson, or in the knowledge in the art at the time of filing, suggests that a first antigen conjugated to an ISS

would produce a greater Th1 response against a second antigen than an ISS that is not conjugated to a first antigen (as discussed further below in reference to the October 23, 2002 Declaration of Dr. Gary Van Nest).

c. The cited references do not provide a reasonable expectation of success with respect to the claimed methods.

The third requirement for a *prima facie* showing of obviousness is that one of ordinary skill in the art must have had a reasonable expectation of success in practicing the claimed invention at the time of filing. *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991); MPEP §2143.02.

From the teachings in the cited primary references Schwartz and Carson, one of skill in the art would expect an enhanced immune response to an antigen when it is conjugated to an ISS. In view of this teaching, one of skill in the art would not predict that an immune response to a second, unconjugated antigen would be modulated. These references do not provide a reasonable expectation of success that administration of an ISS-containing polynucleotide covalently conjugated to a first antigen would modulate an immune response to an *unconjugated second* antigen, including stimulating a Th1 response to a *second* administered antigen. *See* page 30 of the Appeal Brief. For example, page 11, lines 18-28, of Carson suggests that conjugation of an ISS to an antigen affects the way the conjugated antigen is processed. Thus, one would not have had a reasonable expectation of success that an ISS would affect how an unconjugated second antigen is processed.

Additionally, as skilled artisan would not have had a reasonable expectation of success that a first antigen conjugated to an ISS would produce a greater Th1 response against a second antigen than an ISS that is not conjugated to a first antigen.

On October 23, 2002, Appellants submitted a 37 C.F.R. §1.132 Declaration from co-inventor Dr. Gary Van Nest, which provided additional support that the immune response to an antigen following the claimed method (administration of (i) an ISS-containing polynucleotide conjugated to a first antigen and (ii) a second antigen) is different from the immune response to the

antigen (*i.e.*, second antigen) following the control method (administration of (i) an ISS-containing polynucleotide and (ii) the antigen (*i.e.*, second antigen)). Dr. Van Nest's Declaration provides results of controls performed along with the experiments presented in Example 1 of the specification.

In these experiments, conjugating a first antigen (Amb a I) to an ISS produced a much greater Th1 response against a co-administered, unconjugated second antigen (βgal) than an ISS that was not conjugated to the first antigen. For example, Exhibit A indicates that a much larger amount of IgG2a anti-βgal antibodies (which are indicative of a Th1 response) was produced by the administration of (i) Amb a I conjugated to ISS (denoted "AIC") and (ii) βgal (see the last entry in the bar graph labeled "Bgal (1 ug) + 10 ug AIC") than administration of (i) an ISS not conjugated to Amb a I and (ii) βgal (see the third entry in the bar graph labeled "Bgal (1 ug) + 10 ug ISS"). Even *10 or 50 μg* of the unconjugated ISS produced less of an immune response against co-administered, unconjugated βgal (see the third and fourth entries in the bar graph labeled "Bgal (1 ug) + 10 ug ISS") and "Bgal (1 ug) + 50 ug ISS", respectively) than *1 μg* of ISS conjugated to Amb a I that was co-administered with βgal (see the fifth entry in the bar graph labeled "Bgal (1 ug) + 1 ug AIC").

Similarly, Exhibit B demonstrates that a much larger amount of IFNγ (which is indicative of a Th1 response) was generated by the administration of (i) Amb a1 conjugated to ISS and (ii) βgal (see the last entry in the bar graph labeled "Bgal (1 ug) + 10 ug AIC)" than administration of (i) the ISS not conjugated to Amb a1 and (ii) βgal (see the third entry in the bar graph labeled "Bgal (1 ug) + 10 ug ISS)". Even *10 or 50 μg* of the unconjugated ISS co-administered with unconjugated βgal (see the third and fourth entries in the bar graph labeled "Bgal (1 ug) + 10 ug ISS") and "Bgal (1 ug) + 50 ug ISS", respectively) resulted in the production of less IFNγ than *1 μg* of ISS conjugated to Amb a I that was co-administered with βgal (see the fifth entry in the bar graph labeled "Bgal (1 ug) + 1 ug AIC"). The Declaration of Dr. Van Nest shows a much greater shift from a Th2 to a Th1 immune response against a second antigen when a first antigen is used in the claimed methods. This result was unexpected and not predictable by the cited references

and the knowledge in the art at the time of filing. Accordingly, the cited references provide no reasonable expectation of success of the claimed invention and thus do not support *prima facie* obviousness with regard to the claimed invention.

d. The claimed invention produces unexpected results.

Appellants further assert that even if a *prima facie* case of obviousness was established, such a rejection can be overcome by showing that the claimed invention yields unexpectedly improved properties or properties not present in the prior art. MPEP §2144.08(II)(B). As noted above, Appellants' specification and the Declaration of Dr. Van Nest provide evidence that the administration of (i) a first antigen conjugated to an ISS and (ii) a second antigen provides an unexpected and significant improvement in the Th1 immune response generated against the second antigen than the same method performed without the first antigen. In contrast to the Examiner's assertions that these results were expected, the Examiner has not provided any evidence that one skilled in the art would have expected a much greater Th1 immune response against a second antigen when it was coadministered with a first antigen conjugated to an ISS than when the second antigen was coadministered with an unconjugated ISS.

Accordingly, the obviousness rejections of claims 1, 13, 14, 17, 20-23, and 25-33 should be reversed.

CLAIM 14

Claim 14 is dependent on claim 1. As shown above, claim 1 is not rendered obvious by the cited references. Thus, neither can claim 14 be rendered obvious thereby.

Further, claim 14 recites that "the first antigen is a conserved polypeptide of a virus." The Examiner stated that page 21, line 13 to page 24, line 6 of Schwartz discloses this limitation. However, the Examiner did not address the specific limitation of claim 14, *i.e.*, a "*conserved* polypeptide of a virus." Therefore, the Examiner has not met her burden in establishing that this

element is present in any of the cited references. Accordingly, the obviousness rejections of claim 14 should be reversed.

CLAIM 17

Claim 17 is dependent on claim 1. As shown above, claim 1 is not rendered obvious by the cited references. Thus, neither can claim 17 be rendered obvious thereby. Further, claim 17 recites that "the first antigen is a carrier molecule." Appellants' specification defines "carrier molecule" as follows on page 11, lines 1-3:

> A "carrier molecule" refers to an immunogenic molecule used in association with an antigen, usually by covalent linkage, to facilitate, cause and/or modulate an immune response to the antigen. Examples of carriers are provided herein.

Examples of carrier molecules are provided on page 27, lines 1-12, of the specification.

The Examiner stated that page 21, line 13 to page 24, line 6 of Schwartz discloses this limitation. This section of Schwartz discloses ways to couple an ISS to the immunostimulatory portion of a conjugate. This section does not disclose the claimed embodiment that the first antigen is a carrier molecule. Therefore, the Examiner has not met her burden in establishing that this element is present in any of the cited references. Accordingly, the obviousness rejections of claim 17 should be reversed.

CLAIM 20

Claim 20 is dependent on claim 1. As shown above, claim 1 is not rendered obvious by the cited references. Thus, neither can claim 20 be rendered obvious thereby. Further, claim 20 recites that "the first antigen is associated with a carrier molecule."

The Examiner stated that page 21, line 13 to page 24, line 6 of Schwartz discloses this limitation. As noted above, this section of Schwartz discloses ways to couple an ISS to the immunostimulatory portion of a conjugate. This section does not disclose the claimed embodiment that the first antigen is associated with a carrier molecule. Therefore, the Examiner has not met her burden in establishing that this element is present in any of the cited references. Accordingly, the obviousness rejections of claim 20 should be reversed.

CLAIMS 21 -23

Claim 21-23 are dependent on claim 1. As shown above, claim 1 is not rendered obvious by the cited references. Thus, neither can claims 21-23 be rendered obvious thereby. These claims are also non-obvious over the cited references for the reasons discussed on pages 32 and 33 the Appeal Brief. Accordingly, the obviousness rejections of claim 21-23 should be reversed.

CLAIM 37

Claim 37 recites a composition comprising a complex comprising (i) an immunomodulatory polynucleotide covalently conjugated to a first antigen and (ii) *a second antigen*, wherein the polynucleotide comprises an ISS comprising the sequence 5'-cytosine, guanine-3', and wherein the *first antigen is a viral conserved polypeptide* and the *second antigen is a viral variable polypeptide*.

As discussed in detail above, none of the cited references teaches or suggests a *second antigen* in combination with an immunomodulatory polynucleotide-first antigen conjugate as claimed, none of the cited reference provides motivation for modification of the teachings therein to include a second antigen in combination with an ISS-antigen conjugate, and there would have been no reasonable expectation of success for one of skill in the art to use such a combination to modulate an immune response to the second antigen. Therefore, the Examiner has failed to

establish a *prima facie* case for obviousness. Also as noted by the Examiner, the cited references do not disclose the use of a "viral *conserved* polypeptide" or a "viral *variable* polypeptide," with respect to the first antigen and second antigen, as required by claim 37. Accordingly, the obviousness rejections of claim 37 should be reversed.

CLAIMS 40 AND 41

Claim 40 recites a composition comprising a complex comprising (i) an immunomodulatory polynucleotide covalently conjugated to a first antigen and (ii) *a second antigen*, wherein the polynucleotide comprises an ISS comprising the sequence 5'-cytosine, guanine-3', and wherein the first antigen is an allergen.

Claim 41 recites that the allergen is Amb a I.

As discussed in detail above, none of the cited references teach or suggest a second antigen in combination with an immunomodulatory polynucleotide-first antigen conjugate as claimed, none of the cited reference provide motivation for modification of the teachings therein to include a second antigen in combination with an ISS-antigen conjugate, and there would have been no reasonable expectation of success for one of skill in the art to use such a combination to modulate an immune response to the second antigen. Therefore, the Examiner has failed to establish a *prima facie* case for obviousness. Accordingly, the obviousness rejections of claims 40 and 41 should be reversed.

B. Claims 15 and 38 are patentable under 35 U.S.C. §103 over Schwartz *et al.* (PCT Application No. WO 98/55495) or Carson *et al.* (PCT Application No. WO 98/16247), in view of Horner *et al.* (*Cellular Immunology* 190:77-82, 1998) or Chu *et al.* (*Journal of Experimental Medicine* 186(10): 1623-1631, 1997), and further in view of Lee *et al.* (*Ann. Med.* 30:460-468, 1998).

CLAIM 15

Claim 15 is dependent on claim 14, which is dependent on claim 1. As discussed in detail above, claim 1 is not rendered obvious by the cited references Schwartz, Carson, Horner, and Chu. In addition to depending from an allowable independent base claim, claim 15 is also non-obvious over the cited references for the reasons discussed on pages 35 and 36 of the Appeal Brief.

CLAIM 38

Claim 38 is dependent on claim 37. As discussed in detail above, claim 37 is not rendered obvious by the cited references Schwartz, Carson, Horner, and Chu. In addition to depending from an allowable independent base claim, claim 38 is also non-obvious over the cited references for the reasons discussed on pages 37 and 38 of the Appeal Brief.

C. Claims 16 and 39 are patentable under 35 U.S.C. §103(a) over Schwartz *et al.* (PCT Application No. WO 98/55495) or Carson *et al.* (PCT Application No. WO 98/16247), in view of Horner *et al.* (*Cellular Immunology* 190:77-82, 1998) or Chu *et al.* (*Journal of Experimental Medicine* 186(10): 1623-1631, 1997), and further in view of Durali *et al.* (*Journal of Virology* 72(5): 3547-3553, 1998).

CLAIM 16

Claim 16 is dependent on claim 14, which is dependent on claim 1. As discussed in detail above, claim 1 is not rendered obvious by the cited references Schwartz, Carson, Horner, and Chu. In addition to depending from an allowable independent base claim, claim 36 is also non-obvious over the cited references for the reasons discussed on pages 38-40 of the Appeal Brief.

CLAIM 39

Claim 39 is dependent on claim 37. As discussed in detail above, claim 37 is not rendered obvious by the cited references Schwartz, Carson, Horner, and Chu. In addition to depending from an allowable independent base claim, claim 39 is also non-obvious over the cited references for the reasons discussed on pages 40 and 41 of the Appeal Brief.

D. Claims 18 and 19 are patentable under 35 U.S.C. §103(a) over Schwartz *et al.* (PCT Application No. WO 98/55495) or Carson *et al.* (PCT Application No. WO 98/16247), in view of Horner *et al.* (*Cellular Immunology* 190:77-82, 1998) or Chu *et al.* (*Journal of Experimental Medicine* 186(10): 1623-1631, 1997), and further in view of Anderson (U.S. Patent No. 4,673,574).

Claims 18 and 19 are dependent on claim 17, which is dependent on claim 1. As discussed in detail above, claim 1 is not rendered obvious by the cited references Schwartz, Carson, Horner, and Chu. In addition to depending from an allowable independent base claim, claims 18 and 19 are also non-obvious over the cited references for the reasons discussed on pages 41-43 of the Appeal Brief.

CONCLUSION

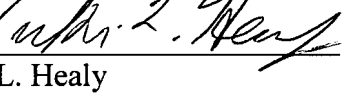
For the foregoing reasons, Appellants assert that the Examiner's rejections of claims 1, 13-23, 25-33, and 37-42 are erroneous and that the claims are patentable. Reversal of the rejections is therefore requested.

If it is determined that a telephone conference would expedite the prosecution of this application, the Examiner is invited to telephone the undersigned at the number given below.

In the event the U.S. Patent and Trademark Office determines that an extension and/or other relief is required, Appellants petitions for any required relief including extensions of time and authorizes the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to Deposit Account No. **03-1952** referencing docket no. 377882000800. However, the Commissioner is not authorized to charge the cost of the issue fee to the Deposit Account.

Dated: September 28, 2007

Respectfully submitted,

By 

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